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APPLICATION

FOR

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TITLE: AIR CONDITIONING SYSTEM INCLUDING A THERMAL CUP HELD ADJACENT TO A VENT FOR CONTROLLING TEMPERATURE OF A BODY

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AIR CONDITIONING SYSTEM INCLUDING A THERMAL CUP HELD ADJACENT TO A VENT FOR CONTROLLING TEMPERATURE OF A BODY

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority of Taiwanese Application No. 092104571, filed on March 4, 2003.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to an air conditioning system, more particularly to an air conditioning system including a thermal cup held adjacent to a vent for controlling the temperature of a body disposed in the thermal cup, and a method of controlling the temperature of a body in a thermal cup through an air conditioning apparatus.

2. Description of the Related Art

In a co-pending U.S. patent application No. 10/201,795, entitled "Electrical Appliance Using Thermal Conductor," filed by the applicant, there is disclosed an electrical appliance in the form of a thermal cup, which includes a temperature control device that is operable to put the thermal cup in one of a heat-absorbing mode and a heat-radiating mode.

The present invention aims to provide a system and method of controlling the temperature of a body in a thermal cup by thermal convection.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, an air conditioning system includes: an air conditioning apparatus having a housing formed with a vent, the air conditioning apparatus discharging temperature-conditioned air currents through the vent; a thermal cup including a hollow cup member made of a thermally conductive material and having an open mouth and a closed bottom, the cup member including an inner surrounding wall that confines a receiving space communicated with the open mouth and adapted to receive a body therein, an outer surrounding wall that cooperates with the inner surrounding wall to confine a vacuum sealed chamber therebetween, and a thermally conductive material disposed in the vacuum sealed chamber; and a cup support mounted on the housing adjacent to the vent, the cup support holding the thermal cup adjacent to the vent such that the temperature-conditioned air currents discharged through the vent reach the thermal cup; whereby, the temperature of the body received in the receiving space can be controlled by thermal convection.

According to another aspect of the present invention, a cup and support assembly is adapted for use with an air conditioning apparatus that discharges temperature-conditioned air currents through a vent in a housing of the air conditioning apparatus. The cup and support assembly includes: a thermal cup including

a hollow cup member made of a thermally conductive material and having an open mouth and a closed bottom, the cup member including an inner surrounding wall that confines a receiving space communicated with the open mouth and adapted to receive a body therein, an outer surrounding wall that cooperates with the inner surrounding wall to confine a vacuum sealed chamber therebetween, and a thermally conductive material disposed in the vacuum sealed chamber; and a cup support adapted to be mounted on the housing adjacent to the vent, the cup support being adapted to hold the thermal cup adjacent to the vent such that the temperature-conditioned air currents discharged through the vent reach the thermal cup; whereby, the temperature of the body received in the receiving space can be controlled by thermal convection.

According to a further aspect of the present invention, a method of controlling the temperature of a body includes: a) providing a thermal cup that includes a hollow cup member made of a thermally conductive material and having an open mouth and a closed bottom, the cup member including an inner surrounding wall that confines a receiving space communicated with the open mouth, an outer surrounding wall that cooperates with the inner surrounding wall to confine a vacuum sealed chamber therebetween, and a thermally conductive material disposed in the vacuum

sealed chamber; b) disposing the body in the receiving space; and c) holding the thermal cup adjacent to a vent in a housing of an air conditioning apparatus such that temperature-conditioned air currents discharged by the air conditioning apparatus through the vent reach the thermal cup; whereby, the temperature of the body received in the receiving space can be controlled by thermal convection.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiments with reference to the accompanying drawings, of which:

Figure 1 is a schematic view illustrating the preferred embodiment of an air conditioning system according to the present invention;

Figure 2 is a sectional view of the preferred embodiment of a thermal cup according to the present invention;

Figure 3 is a perspective view of an example of a cup support employed in the present invention;

Figure 4 is a sectional view of a modified embodiment of the thermal cup according to the present invention; and

Figure 5 is a flowchart illustrating the method of controlling the temperature of a body according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Before the present invention is described in greater detail, it should be noted that like elements are denoted by the same reference numerals throughout the disclosure.

Referring to Figures 1 and 2, the preferred embodiment of an air conditioning system according to the present invention is shown to include an air conditioning apparatus 2, a thermal cup 1, and a cup support 3. The air conditioning apparatus 2 in this embodiment is exemplified as a car conditioning apparatus installed within a car and having a housing 20 that is formed with a vent 21 and that is an integral part of the car body. The air conditioning apparatus 2 discharges temperature-conditioned air currents, i.e., cool or warm air currents, through the vent 21 to condition the temperature of the car interior in a known manner.

The cup support 3 is mounted on the housing 20 adjacent to the vent 21. The cup support 3 may be mounted fixedly on the housing 20 below the vent 21, and has the configuration of a conventional drink holder installed in the car. Alternatively, the cup support 3 may be mounted removably on the housing 20 at a grille (not shown) installed at the vent 21, and has the configuration of a conventional removable container holder, such as that shown in Figure 3.

The thermal cup 1 is held in the cup support 3 adjacent to the vent 21, and includes a hollow cup member 11 made of a thermally conductive material and having an open mouth 110 and a closed bottom. The cup member 11 includes an inner surrounding wall 111 that confines a receiving space 115 communicated with the open mouth 110 and adapted to receive a body 4 (such as a liquid body) therein, an outer surrounding wall 112 that cooperates with the inner surrounding wall 111 to confine a vacuum sealed chamber 113 therebetween, and a thermally conductive material 114 disposed in the vacuum sealed chamber 113. In this embodiment, the thermally conductive material 114 is a coating applied to the wall surfaces of the inner and outer surrounding walls 111, 112 confining the vacuum sealed chamber 113. Alternatively, the thermally conductive material 114 may be a liquid contained in the vacuum sealed chamber 113. Preferably, the thermally conductive material 114 is a superconductor material to provide fast heat conduction. A seal layer 116 is provided at top ends of the inner and outer surrounding walls 111, 112 at the open mouth 110 to seal the vacuum sealed chamber 113.

Preferably, the thermal cup 1 further includes a lid member 12 that is disposed to close the open mouth 110 of the cup member 11.

In use, when the air conditioning apparatus 2 is

activated to discharge cool or warm air currents through the vent 21, the air currents flow toward the thermal cup 1 that is held in the cup support 3 adjacent to the vent 21. Due to the configuration of the thermal cup 1 and through thermal convection, the receiving space 115 of the cup member 11 provides a "cold/hot room effect" that cools or warms the body 4 contained in the receiving space 115 to a temperature approximating that of the cool or warm air currents.

As such, the body 4 contained in the thermal cup 1 can be cooled or warmed through thermal convection without the use of an additional electrical appliance.

Figure 4 shows a modification of the thermal cup 1 shown in Figure 2, which is adapted to receive a body 4' that is a can of beverage or food. In this modified embodiment, the thermal cup 1 includes a lid member 120 made of a thermally insulating material and formed with a through hole 121 that is sized and shaped to match the open mouth 110 of the cup member 11. As such, the body 4' can be inserted into the receiving space 115 through the through hole 121 to be cooled or warmed by virtue of thermal convection when the air conditioning apparatus 2 is in operation.

Referring to Figure 5, in combination with Figures 1 to 4, a method of controlling the temperature of a body according to the present invention includes the steps of providing a thermal cup 1 of the above-

described construction, disposing a body 4, 4' in the receiving space 115 of the cup member 11, providing a cup support 3 on a housing 20 of an air conditioning apparatus 2 adjacent to a vent 21, and disposing the thermal cup 1 together with the body 4, 4' on the cup support 3 such that the cup support 3 holds the thermal cup 1 adjacent to the vent 21 and such that temperature-conditioned air currents discharged by the air conditioning apparatus 2 through the vent 21 reach the thermal cup 1. Therefore, the temperature of the body 4, 4' received in the receiving space 115 can be controlled by virtue of thermal convection.

While the present invention has been described in connection with what is considered the most practical and preferred embodiments, it is understood that this invention is not limited to the disclosed embodiments but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements.